

Serial No. 09/943,574
Docket No. Mald Raff 16 CON2
Amendment B under Rule 116

REMARKS

Claim 30 has been amended to incorporate the limitations of claim 31, which has been cancelled. Claim 30 also has been amended to employ the closed language "consisting essentially of" in place of the open language "comprising."

Claims 34, 40, 42 and 44, which were directly or indirectly dependent on claim 31, have been cancelled as being redundant.

Considering first the double patenting rejection of claims 45-59, Applicants will file a Terminal Disclaimer upon allowance of the remaining claims.

Turning to the rejection of claims 30-44 as obvious from Kunz et al. (Kunz), as noted *supra*, claim 30 has been amended (1) to employ the closed language "consisting essentially of" in place of the open language "comprising," and (2) to limit the composition to one incorporating inulin having an average degree of polymerisation between 20 and 40. It is submitted that Kunz et al. fails to teach or suggest Applicants' claimed invention. More particularly, nowhere does Kunz et al. teach or suggest an inulin composition having an average degree of polymerisation and purity as claimed. That is to say, Kunz et al. does not disclose particulars about the purity of the long-chain inulin product obtained by the described process. Kunz et al. only mentions that the process of "treatment of a crude inulin suspension with suitable inulinases under certain conditions leads to a product which, in addition to long-chain inulin, virtually only contains glucose and fructose, i.e., which is substantially free from short-chain oligosaccharides" and that "this product can be separated at industrial scale either by chromatography, ultra-filtration or crystallization into a fraction which only contains long-chain inulin, a mixed fraction of glucose and fructose and a fructose fraction of high purity" (Kunz et al., col. 2, lines 48-59).

YES SOLOWAY P.C.
30 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.882.7623
FAX. 520.882.7643

75 CANAL STREET
NASHUA, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

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Neither in the "Summary of Invention," nor in the "Detailed Description of the Invention," nor in any of the "Examples," does Kunz et al. disclose particulars about the purity of the obtained inulin product (with respect to the content (in % wt) of remaining monomers, dimers, oligomers, ash and possible alcohol) that are comparable to the ones defined in claim 30, features C, D and E.

Furthermore, Kunz et al. only mentions explicitly a mean chain length (av. DP) of the products obtained in the Examples. However, none of the products disclosed in Examples 2, 3, 4, 5, 6 and 7 of Kunz et al. teaches or suggests an av. DP between 20 and 40.

Accordingly, the generic disclosures by Kunz et al. about the enzymatic process, the purity of the inulin product obtained after enzymatic treatment of crude inulin, and the possible techniques for the separation at industrial scale of the long-chain inulin from glucose and fructose, clearly do not necessarily imply that said long-chain inulin presents all the features of the inulin product of the subject claimed invention.

Although the av. DP as well as the purity of the fractionated inulin product are of importance for defining the inulin product, and Kunz et al. discloses a product presenting certain features with respect to av. DP and purity, Kunz et al. neither discloses nor teaches a product with all the specific physical characteristics of the product of the present claimed invention.

As indicated in the description, the object of the present invention is not only to provide a fractionated polydisperse carbohydrate composition (= inulin product) with particular purity features (features B to E of claim 30), but also to provide a product with particular physical features (feature A of claim 30) which make it possible to prepare an inulin product of the claimed purity by a technically and economically attractive process (see *inter alia* description,

YES SOLOWAY P.C.
30 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.882.7623
FAX. 520.882.7643

75 CANAL STREET
NASHUA, NH 03101
TEL. 603.668.1400
FAX. 603.668.8557

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pages 6-16), namely, aims : p. 6-7; problem: p. 7, § 2 + § 3; product : p. 7-8, process p. 9-10, and detailed description, p. 12, p. 14 and p. 15-16).

As emphasized in the description, it is the combination of the particular physical features of the crystallized, fractionated inulin particles obtained by the directed crystallization process of the present invention that ensures that these particles do hardly include any impurities, do present good filterability without giving rise to clogging of filters, filter mats or centrifuges, and do enable easy washing with water of the filter cake or isolated crystallized fractionated inulin, resulting in efficient removal of adsorbed impurities and mono-, di- and oligosaccharides (with DP<10). Therefore, the features defining the particular crystal form and size, and accordingly the resulting physical properties of the crystallized inulin, are essential and critical features of the product of the subject invention.

These critical features are neither taught nor suggested by Kunz et al.

Indeed, Kunz et al. discloses only in Example 5 (col. 6, lines 1-16) an inulin product obtained by crystallization through slowly cooling from an aqueous solution. This crystallized inulin has an av. DP of 12, which is about the av. DP of native inulin, and which is thus far below the av. DP of the crystallized inulin according to the subject invention (av. DP of 20-40).

Furthermore, in Examples 8 and 9, Kunz et al. discloses a long-chain inulin product, obtained by an enzymatic treatment of an inulin solution involving hydrolysis of the short-chain inulin molecules (DP<10), with subsequent separation and isolation of the remaining long-chain inulin from the reaction mixture. In Example 8, the separation was done by chromatography of an aqueous solution of the reaction mixture, followed by evaporation to dryness of the fraction that contained the long-chain inulin. In Example 9, the reaction mixture in the form of a

YES SOLOWAY P.C.
30 W. CUSHING ST.
TUCSON, AZ 85701
EL. 520.882.7623
AX. 520.882.7643

75 CANAL STREET
NORCHESTER, NH 03101
EL. 603.668.1400
AX. 603.668.8567

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suspension was subjected to membrane ultra-filtration, and the retentate, containing the long-chain inulin, was evaporated to dryness.

The techniques leading to the isolated long-chain inulin products in sold form of Examples 8 and 9 of Kunz et al. are clearly essentially different from the process according to the subject invention, involving a directed crystallization from a metastable aqueous solution under well defined process conditions and subsequent isolation and washing of the crystallized long-chain inulin particles.

Accordingly, the processes disclosed by Kunz et al. for obtaining long-chain inulin and the process yielding the crystallized inulin product of the subject invention, being essentially different, the resulting inulin products have to be assumed to be essentially different too with respect to their physical properties. This applies in particular to the particles form, including crystal form, particle size and diameter, and accordingly to the thereto related properties, in particular the filterability and related possibility to remove impurities and mono-, di-, and oligosaccharides from the crystallized inulin particles by simple washing with water.

The fact that Kunz et al. is completely silent about physical features of the obtained inulin products does not allow one to conclude that the products disclosed by Kunz et al. present the same physical properties as the inulin product of the present invention. To the contrary, in view of the differences between the process disclosed by Kunz et al. and the process of the subject claimed invention, it is unlikely that one skilled in the art would conclude that the products obtained by the process of Kunz et al. and the process of the subject invention present the same or similar physical properties.

YES SOLOWAY P.C.
30 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.682.7623
FAX. 520.682.7643

75 CANAL STREET
NASHUA, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

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As indicated in the description (p. 19, middle of page, "By subjecting ..." to p. 21, line 1), the spherical form of the obtained crystallized inulin according to the subject invention is critical (because it provides good filterability), and accordingly the terms in claim 30 that characterize said spherical form, namely radial symmetry, double breaking and perpendicular fade cross, are essential and critical features too.

As well as the features with respect to purity (the purity having an effect on the properties of the inulin in applications, as well as on the properties of compositions containing the inulin product), the features with respect to physical properties of the crystallized inulin product are essential too (the physical properties having an effect on the technicalities concerning the manufacture of the product and on the resulting purity of the obtained product).

The features regarding physical characteristics thus clearly establish critical differences between the product of the subject invention and the products taught or suggested by Kunz et al., and Applicants are of the opinion that so far the importance of these essential physical characteristics of the inulin product of the subject invention has been overlooked or not given its full merits during the examination of the patentability of the subject invention.

There is clearly no teaching or suggestion in Kunz et al. pointing the skilled person to the directed crystallization process of the subject claimed invention and the resulting crystallized fractionated inulin obtained by it, or to the physical properties of the obtained crystallized inulin product and the resulting physical properties which make the manufacture of said product possible in a technical and economically interesting manner.

Accordingly, it is submitted that the claimed physical properties cited by claim 30 and the several claims dependent thereon are not inherent or obvious from the products disclosed by

YES SOLOWAY P.C.
30 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.882.7623
FAX. 520.882.7643

75 CANAL STREET
NASHUA, NH 03101
TEL. 603.668.1400
FAX. 603.668.8367

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Kunz et al. Therefore, claim 30 and the several claims dependent thereon cannot be said to be taught by or obvious from Kunz et al.

Quite apart from the foregoing, Applicants wish to point to an apparently erroneous interpretation by the Examiner of information given in the description (p. 19, line 22 to p. 21, line 6) mentioned in the Office Action, p. 5, first paragraph. Applicants are alleged to acknowledge (statement in Description, p. 21, lines 2-6) that the prior art does produce spherical inulin particles. In response, Applicants emphasize that the statement should be read in its entirety. Review of the concerned statement clearly reveals that Applicants have not acknowledged that prior art processes have led to spherical inulin particles with good filterability. Applicants did indicate in the concerned statement that by slowly cooling down a metastable aqueous inulin solution, the obtained mixture "contains both spherical and ellipsoid particles, as well as others with different shapes" (emphasis added) and that "Particle stacks such as these will certainly 'clog up'." (Description, p. 21, lines 2-6).

Furthermore, in this respect, reference is made to comparative examples 1 and 2 (Description, p. 36 and 37) from which clearly follows that, in contrast to the inulin particles obtained by the directed crystallization according to the subject claimed invention, inulin particles obtained by prior art processes are difficult or impossible to isolate by filtration (with the obviously concurrent disadvantages, such as the non-possibility to remove side products (monomeric, dimeric and oligomeric saccharides) by mere washing of the inulin particles with water.

YES SOLOWAY P.C.
30 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.882.7623
FAX. 520.882.7643

75 CANAL STREET
NORCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.6567

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Clearly such a mixture of spherical and ellipsoidal particles falls outside the scope of the product of the subject invention, and the concerned prior art does not teach at all the crystallized inulin product with good filterability according to the subject invention.

Instead of teaching the product of the present claimed invention, the poor filterability of, or the clogging up of filters by, said mixture of spherical and ellipsoid inulin particles illustrates the essential aspects and criticality of the physical properties of the spherical inulin particles (with the resulting physical properties) of the present claimed invention, as well as the non-obviousness of said spherical particles vis-à-vis Kunz et al.

Applicants emphasize once more that it is the particular form of the crystallized fractionated inulin particles that makes it possible to obtain the desired fractionated inulin product with a high av. DP (20 to 40) and high purity by a directed crystallization process in a technically and economically attractive manner, with the concurrent resulting beneficial properties of the inulin product.

In view of the above, Applicants submit that the inulin product of amended claim 30 and the several claims dependent thereon are novel and are non-obvious in view of Kunz et al. and, accordingly, respectfully request allowance of these claims.

The foregoing Amendment makes no claim changes that would require further search or consideration by the Examiner. Accordingly, entry of the foregoing Amendment, and allowance of the Application, are respectfully requested.

YES SOLOWAY P.C.
30 W. CUSHING ST.
TUCSON, AZ 85701
TEL. 520.882.7629
FAX. 520.882.7643

75 CANAL STREET
NASHUA, NH 03101
TEL. 603.668.1400
FAX. 603.668.9567

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Respectfully submitted,



Norman P. Soloway
Attorney for Applicants
Reg. No. 24,315

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YES SOLOWAY P.C.
30 W. CUSHING ST.
UCSON, AZ 85701
EL. 520.882.7623
AX. 520.882.7643

75 CANAL STREET
NCHESTER, NH 03101
EL. 603.668.1400
AX. 603.668.8567